Accessibility Testing: Is There a Gap between Developers and End Users that Needs to be Bridged?

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Summary of Session:

The session will look at accessibility testing and identify and discuss possible gaps between the stated accessibility of a site by developers and the experience of end users. We will also talk about strategies for involving faculty in positive ways and how to get needed information to students with disabilities.

Abstract:

At Portland Community College (PCC) we started testing websites, LMS, publisher content, math content etc. with end users a few years ago. We made some surprising observations—there can be a disconnect between web standards and end user navigation. In an evolving field (with moving targets) both results should be considered, and communication between different participants (web developers, end users, publishers and faculty) is important. In this session, we will probe into what to look for when assessing a site, and what to do with varying results. We will discuss how information about accessibility is conveyed, and talk about how we have involved faculty.

Introduction

A collaborative effort by Disability Services and Distance Education at Portland Community College (PCC) to test the accessibility of online learning platforms and tools brought the three of us together a few years ago. Our varying backgrounds and perspectives--Angel, an experienced screen reader user and graduate student, Karen a web developer, and Phyllis, who had years of assistive technology training experience--lent to interesting discussions.

When trying to assess whether a tool was accessible to blind and low vision end users testing with a screen reader, we started to notice there was often a gap between achieving web

accessibility guidelines/standards compliance and achieving a positive end user experience. A website may be built to web accessibility guidelines or standards, but it also may fall short in being helpful to or usable by the end user. While this is a common usability phenomena and the reason for doing usability testing, it has been our experience that accessibility testing is more often testing whether that online content or tool can be **made to** work with a screen reader or other assistive technology, rather than whether that tool or content works for the end user.

It is important to note that our end users are successful students who have learned to effectively navigate content online, even not so friendly user interfaces. But they are not web developers.

This paper will begin with our different perspectives on accessibility, explain the "gap" we found, and suggest strategies for colleges and universities to ensure that students are successful when accessing digital content.

Our Perspectives

Karen: Accessibility Advocate for Online Course Content

Due to my background as a web developer, my perspective was that web standards/guidelines were the answer to making online content accessible.

But at PCC in 2013, Distance Learning, Disability Services and Math departments collaborated on a subject area accessibility study in mathematics. A research assistant for the study, who is blind, provided feedback that was critical to the outcome of the study. He said that he would prefer to learn math using braille instead of a screen reader. That was a lightbulb moment for the math faculty and me. While it's essential to make sure a website is accessible and ensure that it reads correctly with a screen reader, is the website helpful and usable? He helped us realize that accessibility includes a discussion with the end user. Web standards are only part of the solution. Working with Angel and other end users led to similar discoveries.

Phyllis: Accessibility Specialist

For 18 years I taught people with disabilities to use assistive technology at home, school, or worksites. At my previous job, students showed me where they were having problems accessing course content and we tried to come up with ways to access it, if possible. They were using screen magnification software, speech recognition, screen readers, or sometimes no assistive technology at all. I understood obstacles students face when accessing course materials, but I became acquainted with formal accessibility guidelines only after I had been doing this type of training for many years.

When I came to PCC a couple of years ago, a student was having difficulty accessing our learning management system using VoiceOver. A Manager of Distance Learning came to see the barrier and the student's experience. The manager had never seen anyone use a screen reader but was well versed in accessibility standards. After watching the student for a few minutes, he asked me why the student didn't use headings to navigate. I told him that often the

screen reader users I knew didn't use headings because they had accessed content so often that didn't have them, that it wasn't their regular practice.

The student had a rather long way of accessing the LMS, but it turned out that his main difficulty was accessing one part of it, and we discovered that it WAS really difficult to access. As we started doing website testing with end users, we found that there was often this type of gap--a student accessed material in ways that was surprising to developers (including publishers, web teams, etc) who often had not seen someone use a screen reader. We found this gap occurred more with screen reader users than with other AT users.

Angel: End User Tester

I have been a JAWS screen reader user since it was created many years ago. Before JAWS I used a program called ASAP and DOS and taught myself throughout undergraduate school. While in graduate school I first worked with Portland State University as an accessibility tester several years ago and began testing at PCC in 2013. I continue to learn new tricks with each new version of JAWS. For example, while testing I learned about a JAWS command that makes it easier to access tables. With every update of JAWS and all the changes with website accessibility, I've managed to keep up and have become a fairly advanced JAWS as well as NVDA and IOS/Voiceover user. With that said, I do not have the technical experience of coding and scripting like some, but I can say I do have a good idea of the use of accessible computer technology and the capacity to problem-solve if I run into snags.

Difficulties sometimes arise when there appears to be a conflict between stated accessible content and my ability to access it. As I stated above, I am constantly learning new tricks, but I also fall back on trusted ways I have used to navigate.

Discovering the Gap

Beginning a few years ago, the three of us started working together to do accessibility testing of online course applications, tools and platforms. Whenever a course uses a web app, a form or media player, or anything that might require a mouse click or drag, we want to test it to see how well it works with a screen reader and for a screen reader user.

We noticed that often a developer/publisher will claim something is accessible but we find that it is not easily read or used by a screen reader user. Our student testers are successful students and experienced screen reader users, even if they don't have familiarity with web standards. If they can't use the products, then students less experienced will certainly struggle. This caused us to ask in what terms do we define accessibility? It cannot be by just web standards validation anymore. A usability evaluation must be included.

In their paper, "Designing Online Courses for Screen Reader Users", Kearns et al point out that when end user testing they noticed that, "a pronounced difference between the blind and sighted students was the manner in which they moved through the material. The sighted

students jumped back and forth far more than the blind students who tended to advance through the content in a more linear fashion" (p. 4). It is important to realize that the screen reader user's experience of digital content is necessarily more linear and markedly different from that of sighted users. For example, Angel, who achieved Masters level education using a computer for many of her classes, prefers to use arrow keys to navigate instead of using the tab key or by headings.

But we also noticed more subtle differences that impacted the accessibility and usability of a site. Angel didn't always understand what the formatting of a web page meant even if the screen reader verbalized it (heading levels and sub-lists for example.) Why would she? Where would she have learned that? Many of our faculty don't understand what a heading is.

And even more subtly, she didn't realize that the screen reader navigated tabular data from left to right, top to bottom even if she used the down arrow. Why would she?

On the flip side, as a developer, Karen wasn't aware that a screen reader user wouldn't naturally use the tab key or headings to navigate a web page. Angel explained that to do that would be very time consuming and would not provide access to other text on the page. And while she sometimes uses headings to navigate, a large percent of web pages and digital documents are still not structured with headings, so she has become more accustomed to using other navigation keys to move around the page.

And then there are developers whose web applications and tools use their own set of shortcut keys to create keyboard accessibility. These shortcut keys too often conflict with screen reader shortcut keys or they just do not work. And even if they do work properly, they are particular to that single tool, application or platform so a screen reader user has to memorize an infinite number of keystrokes for every website or tool accessed. This idea is unrealistic...think of all the websites you access on a given day. Now imagine having to memorize key strokes for each to effectively navigate and interact with web-based content and tools, like a sighted person using a mouse would.

So even when a website meets a set of accessibility standards, a screen reader user may not use the site (or its tools and applications) to its full benefit. Who or what is responsible for this gap? The web developer, the user or the assistive technology?

Testing Third Party Software

When we launched our accessibility of online course content initiative at PCC in 2011, we chose WCAG 2.0 AA as our guidelines for accessibility. This is the standard we hold all online course developments to. Eventually we realized that instructor content was not our biggest area of concern. Third party adoptions are even more critical. While we can change instructor created content fairly easily, we cannot change third party products.

In order to get some assurance of accessibility from these third party online products, we started asking for VPATs. While VPATs can be informative, we were often left with a lot of questions,

and we are somewhat skeptical when a company fills out a VPAT on their own product. So we started testing these interactive products with experienced screen reader users.

A special challenge has been math accessibility. We had one publisher that assured math faculty that their content was accessible to a screen reader however multiple adjustments had to be made to the configuration of the screen reader. We were never able to get the screen reader to work on this product, even with several conference calls to the publisher and another institution who had used it. After multiple attempts, we brought in the faculty member who wanted to use the product, so she could see our challenges. When she saw the problem, she became an advocate for accessibility and usability. We now prefer to test with the faculty member who wants to use the product present since many have never witnessed a screen reader being used.

Another math publisher had made great strides from when we first tested their very inaccessible product. The site now read with a screen reader, and math equations were voiced. We came to realize, though, that while the math read correctly the equations were not written with MathML but were actually images with alt text. This prevented the end user from moving character by character through the equation. Picture trying to understand a math equation if you can only hear it in one chunk, and that's what the end user was experiencing.

Testing Without an End User

We appreciate that several faculty members understand the value of testing content with screen readers, and some have knowledge of JAWS, NVDA or VoiceOver, and have them on their computers. It is wonderful that the faculty member is cognizant of accessibility issues, is attempting to design content according to standards, and is even testing them on their own with a screen reader. Certainly, many of our faculty do none of this, and we would like to provide a digital accessibility center where faculty can come to learn more and to see end users test content. But we also want to point out that while testing yourself without an end user is valuable, it may not point to all the usability issues. For example, keyboard accessibility is often thought to be synonymous with screen reader accessibility. But as we point out above, testing by using the tab key may not give the same results that an end user experiences.

For example on our campus maps a drop down menu is used to choose a building map. An average user wouldn't think of it as a form because there is no submit button, but it actually is a form field that gets submitted when the user hits enter. If they don't hit enter, the corresponding map does not change, and when presented with a drop down list most screen reader users hit the down arrow and expect it to be selected. Advanced users saw that it was a form field and hit enter, but even in this case the name of the page didn't change so there was confusion about where they landed. Developers of the maps had ensured that they were keyboard navigable, but in this case keyboard navigability did not translate directly to usability.

Recommended Solutions

Involving Faculty

We saw that there were more pieces to the puzzle than just checking for accessibility and/or usability. As discussed, we perform and recommend end user testing as often as possible. And we find a lot of value in showing faculty how a screen reader user accesses (or doesn't access) course and publisher content.

At PCC, Disability Services collaborates with Distance Learning on subject area studies designed to examine the accessibility of a specific subject area. To date there have been two subject area studies: one in mathematics (fall term 2012) and one in Computer Science, Computer Information Systems and Computer Application Systems (winter term 2014).

The math study is described earlier in this paper, but it should be mentioned that the math study brought WeBWorK to our attention. WeBWorK is an open source, online homework site. It is more accessible than most publisher-based homework websites. As a result of the study's recommendation, Disability Services and Distance Learning helped to advocate for the adoption of WeBWorK at PCC and the server space required to host it. Many math faculty, even those not involved in the original study, contribute to the continued development of accessible math courses on WeBWorK. PCC has even been involved in writing a VPAT for WeBWorK and recommending accessibility and usability improvements. These are far reaching benefits from a three month study involving two faculty.

The Computer Science, Computer Information Systems and Computer Application and Office Systems study involved three instructors, one from each of the departments. They looked at the accessibility of their respective subject areas. The instructors began the study with the impression that blind and low vision students could not program or use computer programs. They quickly saw that by using a screen reader the students were able to access most of the programs quite well, and could program too. It was gratifying to watch the instructors go from being skeptical to embracing accessibility as an important part of teaching.

Working with Publishers

You can't live with 'em and you can't live without 'em. Higher education (at least in community colleges) uses a lot of online publisher content. It's often bundled "for free" with the textbooks. Instructors who use the publisher's' online materials usually love them. But those online materials are the cause of some of our biggest accessibility problems. And as evidenced from recent Office of Civil Rights settlements, the use of these materials, if they are inaccessible, can sometimes lead to discrimination lawsuits against the college (not the publisher).

We started inviting publishers to be part of the solution. We invite the book representatives to our testing of their online content and we send our feedback and questions to the accessibility

representatives at the publishing companies. We also ask them to help us develop alternative, accessible content when it's their materials that create a barrier for our students with disabilities.

Two accessibility managers from leading publishing companies have attended our Assistive Technology committee meetings to talk with us. And one publisher's Learning Solutions Consultant has actually hired end users to do accessibility and usability testing and plans to develop equally effective options when barriers are identified.

Our hope is that publishers will participate in the solution, not just claim a future edition or version will finally be accessible. We need alternative, accessible solutions now when their products create barriers for our students with disabilities.

Working with Students

Collaborating with the Oregon Commission for the Blind

We recognize that often our students are not very skilled at using their technology to access digital content, even when the content is deemed accessible. To try and remediate this issue, we forged a relationship with the Oregon Commission for the Blind (OCB) so that they are aware of the types of interfaces and content a student would have to access at PCC. We have provided their trainers with demo websites of our portal and our LMS so they can train and familiarize potential students. Through this relationship, we are working to ensure students have better screen readers skills when they come to PCC.

Documentation and Orientation Guides to complex platforms

As a solution for students who do not have advanced screen reader experience and struggle when using tools like our LMS (D2L Brightspace) we modified a guide for D2L (originally created by Stephen F. Austin State University) to assist with the complicated task of navigating and performing required course related tasks using JAWS. This guide gives the student accessing D2L step by step directions including setting administrative settings optimal for JAWS use, an orientation to the overall layout of D2L and what to expect when using the content features of assignments, quizzes, etc.

Individual Trainings

We have increased training and support for students using screen readers and other AT. PCC now has a full time AT trainer and two Accessibility Specialists who can help students learn to use and benefit from AT. In addition, a blind student who is taking statistics is meeting with Angel on a weekly basis to improve the student's use of JAWS. The student is a fairly new JAWS user, and we realized that although she has had training at OCB, that we need to provide specialized one on one training, precisely because she may not know all the "tricks" for accessing content more efficiently. We are planning to continue these type of supports.

Bridging the Gap

In their paper “A Challenge to Web Accessibility Metrics and Guidelines: Putting People and Processes First” Cooper et. al say, “Accessibility considerations need to be built into the everyday practices across the full web product life-cycle from conception and specification through development to delivery and maintenance” (p. 3). They suggest, and we agree, that end users should be incorporated in the development as well as the testing of digital content. As we have come to realize, it is important for developers, publishers and faculty to witness the end user experience even if they are cognizant of accessibility standards. And, it is important to develop ways for end users to increase their skills so that they are able to benefit from the accessibility standards and use digital content more efficiently. In the end, the purpose of testing for accessibility is to ensure that all students can access content in ways that are helpful and easy to use. We can work towards this goal by understanding both accessibility standards and the experiences of end users.

References

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